

CLAIMS

What is claimed is:

- 1 1. A tool comprising:
 - 2 a body having a chamber;
 - 3 a piston within the chamber;
 - 4 a nose having a channel;
 - 5 a pin within the channel and physically independent of the piston;
 - 6 a propulsion element coupled to the body to propel the piston against the pin;
 - 7 and
 - 8 an actuation element coupled to the propulsion element to actuate the
 - 9 propulsion element.
- 1 2. The tool recited in claim 1, wherein the channel is dimensioned to retain a fastener until the propulsion element is actuated.
- 1 3. The tool recited in claim 1, wherein the piston has more mass than the pin.
- 1 4. The tool recited in claim 3, wherein the piston comprises at least one resilient bumper.
- 1 5. The tool recited in claim 1 and further comprising:
 - 2 a tip adapter within the channel and having an interior bore within which the
 - 3 pin is movable.

1 6. The tool recited in claim 5, wherein the tool comprises a vacuum element to
2 couple to a vacuum generator, wherein the nose comprises a passage to receive
3 vacuum from the vacuum element, and wherein the tip adapter comprises a
4 cylindrical wall having a hole to communicate with the passage to receive vacuum.

1 7. The tool recited in claim 5, wherein the tip adapter comprises an additional
2 actuation element coupled to the propulsion element, wherein the propulsion
3 element is to be actuated only if both the actuation element and the additional
4 actuation element are moved.

1 8. The tool recited in claim 7, wherein the actuation element and the additional
2 actuation element each comprise a blocking element to block a pilot air vent.

1 9. The tool recited in claim 1, wherein the tool comprises a vacuum element
2 coupled to the chamber to retract the piston when vacuum is applied to the vacuum
3 element.

1 10. The tool recited in claim 1, wherein the actuation element comprises a
2 compressible member to move within the channel.

1 11. The tool recited in claim 1,
2 wherein the propulsion element comprises a supply hose connection and a
3 pilot hose connection to couple to a supply hose and to a pilot hose, respectively,
4 wherein the supply hose connection is to provide vacuum when air within
5 the pilot hose connection has greater than a predetermined pressure, and
6 wherein the supply hose connection is to provide air pressure when air
7 within the pilot hose connection has less than the predetermined pressure.

1 12. A tool comprising:
2 a body having a chamber;
3 a piston within the chamber;
4 a nose coupled to the body and having a channel;
5 a pin within the channel and physically independent of the piston;
6 an air delivery infrastructure to propel the piston against the pin; and
7 an actuation element coupled to the air delivery infrastructure to actuate the
8 air delivery infrastructure.

1 13. The tool system recited in claim 12, wherein the channel is dimensioned to
2 retain a fastener until the air delivery infrastructure is actuated.

1 14. The tool recited in claim 12, wherein the piston has more mass than the pin.

1 15. The tool recited in claim 14, wherein the piston comprises at least one
2 resilient bumper.

1 16. The tool recited in claim 12 and further comprising:
2 a tip adapter within the channel and having an interior bore within which the
3 pin is movable.

1 17. The tool recited in claim 16 and further comprising a vacuum element,
2 wherein the nose comprises a passage coupled to the vacuum element to receive
3 vacuum, and wherein the tip adapter comprises a cylindrical wall having a hole to
4 communicate with the passage to receive vacuum.

1 18. The tool recited in claim 16, wherein the tip adapter comprises an additional
2 actuation element coupled to the air delivery infrastructure, wherein the air delivery
3 infrastructure is actuated only if both the actuation element and the additional
4 actuation element are moved.

1 19. The tool recited in claim 18 and further comprising a pilot air supply to first
2 and second pilot air vents, and wherein the actuation element and the additional
3 actuation element each comprise a blocking element to block the first and second
4 pilot air vents, respectively.

1 20. The tool recited in claim 12 and further comprising a vacuum element
2 coupled to the chamber to retract the piston when vacuum is applied to the vacuum
3 element.

1 21. The tool recited in claim 12, wherein the actuation element comprises a
2 depressible member.

1 22. The tool recited in claim 12,
2 wherein the air delivery infrastructure comprises a supply hose connection
3 and a pilot hose connection to couple to a supply hose and to a pilot hose,
4 respectively,

5 wherein the supply hose connection is to provide vacuum when air within
6 the pilot hose connection has greater than a predetermined pressure, and

7 wherein the supply hose connection is to provide air pressure when air
8 within the pilot hose connection has less than the predetermined pressure.

1 23. A fastener installation tool comprising:
2 a body having a cylindrical chamber;
3 a primary hammer movable within the chamber;
4 a nose coupled to the body and having a channel that is dimensioned to
5 receive a fastener;
6 a secondary hammer, physically independent of the primary hammer, having
7 a pin movable within the channel;
8 an air delivery infrastructure to propel the primary hammer against the
9 secondary hammer, to cause the pin to strike the fastener; and
10 an actuation element coupled to the air delivery infrastructure to actuate the
11 air delivery infrastructure.

1 24. The tool recited in claim 23, wherein the primary hammer has more mass
2 than the secondary hammer.

1 25. The tool recited in claim 23 and further comprising:
2 a tip adapter within the channel and having an interior bore within which the
3 pin is movable.

1 26. The tool recited in claim 25 and further comprising a vacuum element,
2 wherein the nose comprises a passage coupled to the vacuum element to receive
3 vacuum, and wherein the tip adapter comprises a cylindrical wall having a hole to
4 communicate with the passage to receive vacuum.

1 27. The tool recited in claim 25, wherein the tip adapter comprises an additional
2 actuation element coupled to the air delivery infrastructure, wherein the air delivery
3 infrastructure is actuated only if both the actuation element and the additional
4 actuation element are moved.

1 28. The tool recited in claim 27 and further comprising a pilot air supply to first
2 and second pilot air vents, and wherein the actuation element and the additional
3 actuation element each comprise a blocking element to block the first and second
4 pilot air vents, respectively.

1 29. The tool recited in claim 23 and further comprising a vacuum element
2 coupled to the chamber to retract the primary hammer when vacuum is applied to
3 the vacuum element.

1 30. The tool recited in claim 23,
2 wherein the air delivery infrastructure comprises a supply hose connection
3 and a pilot hose connection to couple to a supply hose and to a pilot hose,
4 respectively,

5 wherein the supply hose connection is to provide vacuum when air within
6 the pilot hose connection has greater than a predetermined pressure, and

7 wherein the supply hose connection is to provide air pressure when air
8 within the pilot hose connection has less than the predetermined pressure.